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Wood Pellet Milling Performance in a Suspension-Fired Power Plant

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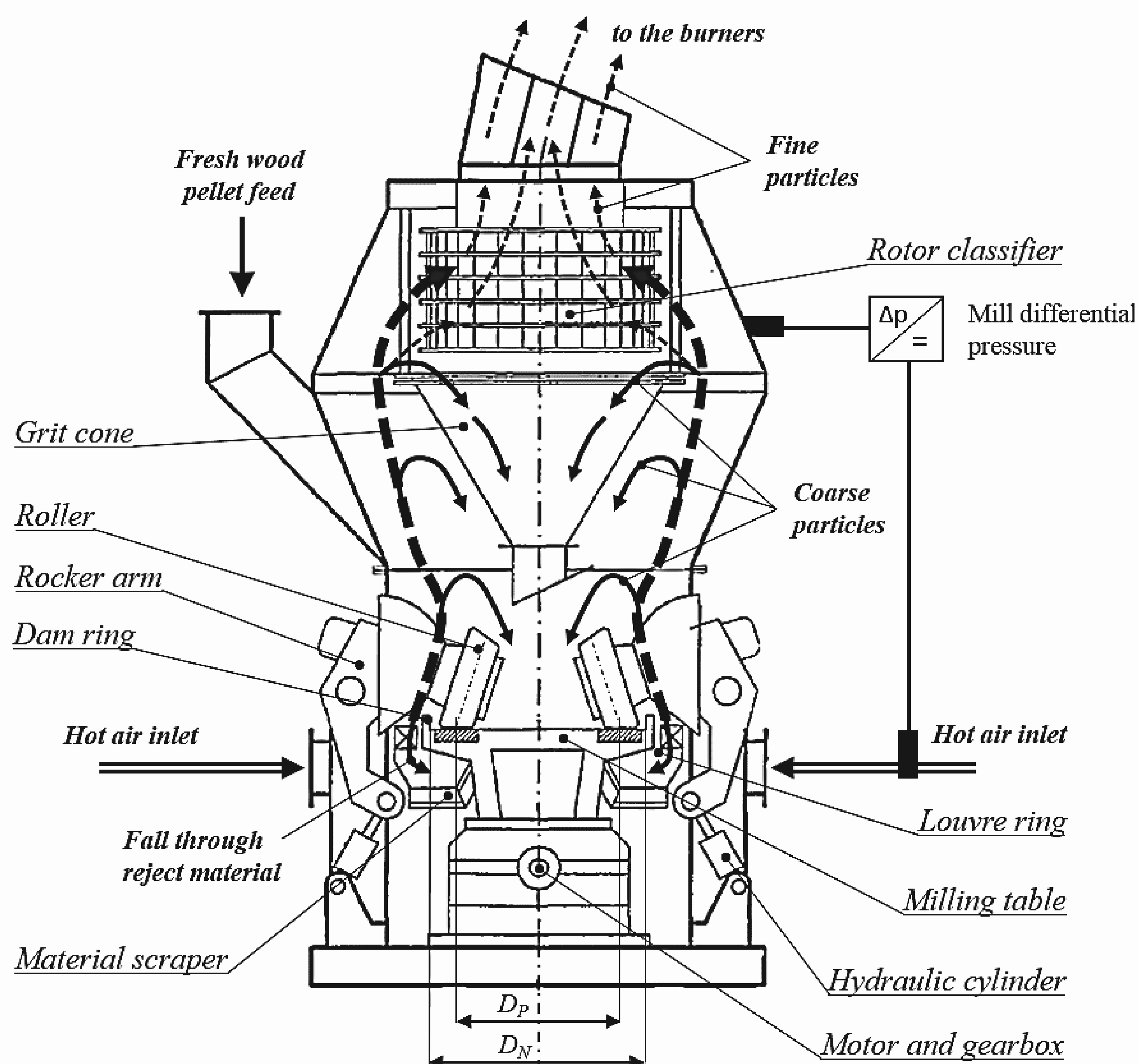
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What were our motivation and research objectives?

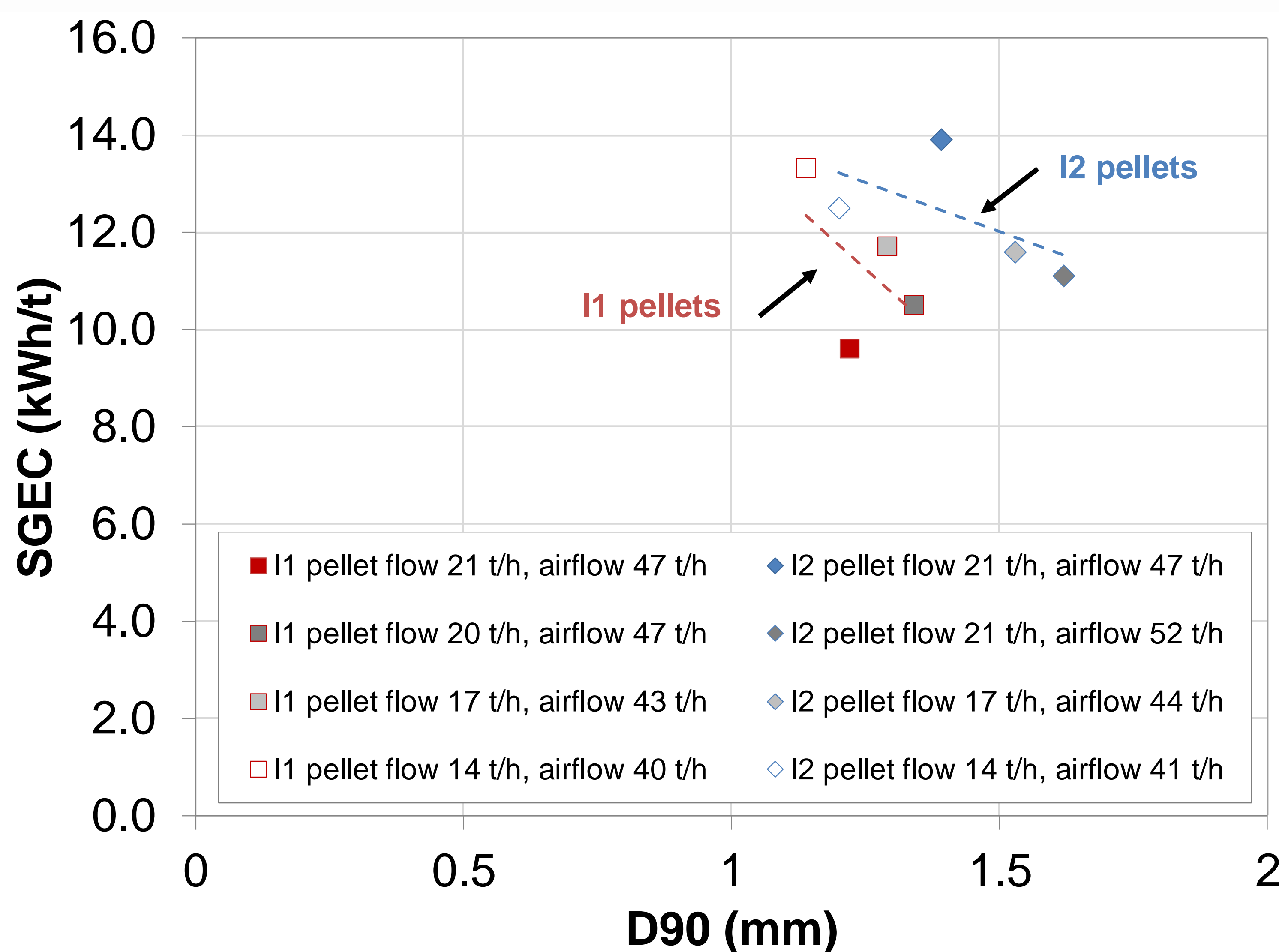
- There are limited experimental data on 100% wood pellet comminution in full-scale coal vertical roller mills.
- To study if the grindability in roller mills and particle separation in dynamic classifiers were affected by the particle size distribution (PSD) of material within pellets.
- Understanding pellet quality properties that affect the milling performance will ensure efficient pellet milling and hence optimize the combustion process.

How was the milling performance assessed?

- 1) Grinding **I1 pellets** (comprise finer particles) and **I2 pellets** (comprise coarser particles) in roller mills
- 2) Mill data collection
 - Specific grinding energy consumption, SGEC (kWh/t)
 - Mill pressure drop, Δp (kPa)
- 3) Isokinetic extraction of fine particles from burner pipes
 - Size/shape analysis using a dynamic image analyzer



Main findings



Conclusions

- The PSD of material within pellets affects the full-scale milling behavior and particle classification (i.e., cut size).
- I1 pellets yielded a smaller classifier cut size, required less grinding energy, and a lower mill pressure drop.
- The original elongated wood particle shape was not altered by vertical roller mills.
- Operating the mills at higher loads had unfavorable effects on mill pressure drop and classifier cut size. However, SGEC was reduced at higher loads.

